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George Washington Flowers
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Engravd for R.P.'s Hist.y of Penn.a
A Map of
PENNSYLVANIA
DELAWARE
NEW JERSEY &
MARYLAND,
with the Parts adjacent.
PART OF NEW YORK
PENNSYLVANIA
VIRGINIA
ATLANTIC
Lake Erie
Endless Mountains
PHILADELPHIA
BALTIMORE
Federal City
Cape May
Cape Inlopen or Cape James
Cape Hinlopen or Fenwicks Island
Thackara S.

FACTS AND ARGUMENTS

RESPECTING

THE GREAT UTILITY

OF

AN EXTENSIVE PLAN

OF

INLAND NAVIGATION

IN AMERICA.

BY A FRIEND TO NATIONAL INDUSTRY.

To scatter plenty round a smiling land.

GRAY.

Philadelphia:

PRINTED BY WM. DUANE, NO. 106, MARKET-STREET.

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1805.

C288F

INTRODUCTION.

AS very little new can be said on the subject of Inland Navigation, the following sheets are rather extracts from papers already written to shew its utility—the only merit claimed is the application, and a wish to stimulate the people of this country to a pursuit so much to their own interest—if therefore I shall succeed in the smallest degree in either of these objects I shall think myself amply repaid for the little trouble I have taken upon the occasion.

A FRIEND TO NATIONAL INDUSTRY.

January 1*st*, 1805.

INLAND NAVIGATION, &c.

EXPERIENCE and time which overcome prejudices and give instruction to the wisest men, have given a spring to the ingenuity and public spirit of the country, which augurs a more rapid and effectual progress in the interior improvements of the United States, than at any former period. Experiments on the utility of good roads, bridges, and canals, have been for upwards of 40 years favorite objects in Pennsylvania. This state indeed, appears to have led the way to improvement in all the most useful undertakings by the economy and policy of her institutions. It can be perhaps no cause of just reproach, if other states pursuing her example have gone farther and with even greater spirit and success. But it might become a just cause of censure, if the wisdom and liberality of the state were to abate or to hold back from activity the hand of internal improvement, while the surrounding states were seizing upon the precious moments of peace and prosperity, to secure for their citizens all the permanent advantages which belong to the establishment of the easiest, cheapest and most durable means of communication.

New-York has long been an honorable and successful rival of Pennsylvania, in the various modes of internal improvement, and has even been so persevering as to reach our frontier by her roads and canals, and actually carries our produce by those means to enrich

her citizens and to encrease their commerce and prosperity.

Jersey profiting by the example, and a witness to the success of her neighbors, has entered into the honorable competition; the construction of roads, bridges, and canals are become favorite objects of her hardy industry, and we may soon expect to see the waters of the Raritan and Delaware commingle their blessings and diffuse their riches, by the mediation of public spirit and a salutary policy.

On the other side, Maryland, hitherto perhaps behind all her neighbours in these branches of policy, has at length awakened to her interests. Her lands locked up by the antiquated prejudice which estimated a vast extent of land in a state of nature, rather than the productive use of a well cultivated part; which had disregarded or did not know, that roads and canals are to the country what the veins are to the human body, the channels of health and life; has commenced in the career of emulation, and promises already to rival her neighbours in the promotion of good roads and inland navigation.

Virginia, which had reposed rather upon lettered than upon practical science, has awakened from its indifference, and in the acts of its legislature in the present year, the friend of public improvements may perceive with pleasure, that she promises in this path of emulation to be worthy of herself.

But South-Carolina in sober and unostentatious wisdom proceeds in the promotion of internal improvements, which far outstrip those of any other state. Her legislature merits the admiration and applause of this country for the noble and permanent rewards which have been held forth to those who have associated to carry on the important navigation of the Catawba.

As the object of this pamphlet is to awaken from the apparent apathy, men hitherto disposed to enter-

prizes of public utility, the generous activity of other states is here introduced, only to direct attention to what is going on in them, at a moment when the legislature of Pennsylvania has already manifested by the encouragement given to the great road to Pittsburgh, its disposition to favor undertakings calculated to promote the interests and prosperity of this state.

As no example that has recently presented itself is so well worthy of applause and imitation as that of the legislature of South-Carolina, an enumeration of what they have done, appears due to their public spirit and deserves particular notice on this occasion.

To the association for opening the *Catawba and Wateree rivers*, a charter has been granted under the name of the CATAWBA COMPANY, by which they are bound to clear away shoals and remove obstructions, and to render these rivers navigable. In the accomplishment of this purpose, they have given the charter in perpetuity, and the shares are for ever free from all taxes or duties on the part of the state; the company is allowed to levy a toll equal to 25 per cent. on the capital which they expend; *all the vacant land* within two miles of the banks of the improved navigation from Camden ferry to the North-Carolina line is given to them in fee simple; being a distance of 100 miles, which it has been already ascertained contains 40,000 acres, some of them worth five and none less than half a dollar an acre; it gives the company the exclusive right to a ferry at Rocky Mount, where they have already established a beautiful village with several mill seats, contiguous to the great military arsenal built by the United States in 1802.

These grants bold in their object and more liberal than any known in the history of internal improvements in this country, must redound to the advantage as much as to the credit of that state, the Catawba flowing through an immense tract of country in the two Carolinas.

This navigation is expected to be completed in three years up to the North-Carolina line; and as the improvements in North-Carolina are carrying on with *equal* spirit, it is expected that about the same period the inland navigation will be free from the source of the Wateree branch of the Catawba to the tide water at Charleston; opening to the citizens of those states and to the general commerce of the country, sources of wealth that must greatly exceed all the accessible resources at present possessed.

As we are never so well instructed as by example; and as success in experiment is always to be preferred to the unproved theory; the examples which have been given by this state have been so well followed by others, that it cannot be to our discredit to emulate now those who have before emulated us, and who are our rivals now, or who have gone beyond us in pursuing plans of improvement with success. It is often asked—*Why should Pennsylvania, which possesses so many means superior to other states, have yet to accomplish so much?*

It is difficult to give a satisfactory answer—but the enquiry is worthy of the dispassionate attention of every citizen. The subject cannot now interfere with the passions of any party, it is one of those subjects fortunately upon which all parties must unite, and in which the spirit of emulation will be who shall most effectually and zealously promote it.

Preferring experience to theory therefore, it is contemplated here to resort to such works on the subject of public improvements as have been published, and to shew from them the beneficial results. Observation will not be spared where the subject may require it, and should any reflections suggest themselves in the course of the narration, they shall be offered with deference and respect.

The want of novelty in many of the facts may indeed be objected to, but they will be sufficiently

compensated by their utility, and by the probability that they may call the attention of men of talents who may possess the means and the will, to promote some general plan or plans of improvement, especially the navigation of our principal rivers; the regards and the interests of the landholder may be engaged; the practical farmer, the merchant and the manufacturer may discover how much their interests are capable of being promoted by such improvements; and he who feels an honest pride in the prosperity and reputation of his country, may in promoting such useful undertakings derive delight from the reflection, that the expenditures which may be made instead of being employed in the ruin or enslavement of other nations, are nobly applied to the promotion of the happiness of our own.

It is every day said in common conversation that the establishment of good roads shortens the distance between places—they also economise time and money. The value of the remark, perhaps is not so much attended to in practice as it is generally admitted in theory.

A few years ago, the ordinary time of travel between Philadelphia and Lancaster, was four or five days; it is at present common to breakfast in Lancaster and dine in Philadelphia. This fact alone proves that there is a saving in travelling of between three and four days, and that a good road shortens the journey in effect, three fourths. The journey with produce was more tedious; but it is now performed not simply in a shorter portion of time but with a less number of men and horses; so that time, labor, the wear and tear of carriages and horse expence are all reduced by the construction of a good road.

The expence of land carriage for produce is nevertheless still immense, compared with that by which articles of the same weight and quality are conveyed on navigable rivers or canals. Let every

Pennsylvanian extend his mind to a comparison of the difference which would exist between the price of carriage of every kind of produce, if we could have water carriage from lake Erie to Philadelphia—or from Tyoga point, on the frontier of New York state, to the mouth of the Delaware canal.

Yet stupendous as such a passage may appear on a superficial view, it is not only possible but practicable—and much more easily accomplished than what South Carolina has already began, in opeuing the Catawba and Wateree rivers.

Accident threw into my hands a few weeks ago, a description of the Susquehana, published in 1796, in this city; from which much useful and interesting information is to be derived. From that publication the following facts are taken:

A navigable communication with Lake Erie is practicable by two ways. The distance of French creek from the bay of Presque Isle, is only 15 miles, and the late general Irvine who was well acquainted with that country and a competent judge, has frequently declared the practicability of a canal by that course, so as to afford a competent navigation for vessels capable of conveying produce into the Alleghany down to Pittsburgh.

Again, a portage of only 9 miles separates Lake Chataque in New-York state from Lake Erie, and that lake which is navigable extends within a few miles of the Pennsylvania frontier, and is in fact the main source of the Alleghany river.

Descending the West Branch of the Alleghany the Kiskeminetas river falls into the Alleghany at some distance above Pittsburgh. The Kiskeminetas rises at a very short distance from the source of the Juniata; the former running in a south westerly course; the latter eastwardly, till it falls into the Susquehanna above Harrisburgh. The heads of these two rivers are separated by a portage of only 29 miles. The Juniata is a noble river.

Various other spacious creeks, which are larger than many of the most celebrated European rivers, fall into the Alleghany, and are separated at their sources by very short portages. Such is Toby's creek which falls into the Alleghany on the east side, midway between the junction of the Kiskeminetas and French creek with the Alleghany. Toby's creek has its source but a few miles from one of the head waters of the Alleghany; runs parallel for some distance, but in opposite directions with the Sinemahoning, one of the head branches of the Susquehanna; and a branch of which also is separated only by a portage of 23 miles from Alleghany navigable waters, that flow in a returning course through New-York state.

Sinemahoning, West Branch, Bald Eagle creek, Clearfield, Mushannon and Pine creek appear to have been spread by the beneficence of Providence over the country to invite the hand of man to pour the fruits of his industry from their limpid waters into the majestic stream of the Susquehanna; which receives in its passage and to its confluence at Northumberland with the West Branch, the plentious waters of Lycoming, Loyalsock, and Muncy. The other, that is the West Branch of the Susquehanna, is even more abundantly supplied by the contributions of rivers and creeks. One of the sources of this branch is in Otsego lake in N. York state, very near the Mohawk river, the stream which issues from this lake is called the Unadilla river, and is a spacious water; in its course it penetrates Pennsylvania, and returns again into New-York, apparently to receive and convey the two-fold branches of the Chenango, to their common junction with the Tyoga a few miles within the Pennsylvania frontier, whence it flows and receives in its beautious meandrings to Northumberland, on the south side Sugar creek, Tawandee creek, and Bowman's creek; and on the opposite side the waters of the Wyalusing, Meshoppen, Lachawannoe, Catawissy, and various inferior streams.

Tyoga river which is the great southern source of the West Branch of Susquehanna, has three branches for its head, two of which rise in Pennsylvania, the other which is the principal, springs in the Genessee, in the neighbourhood of the numerous lakes that beautify that fertile country. The Unadilla head, is but the short distance of 20 miles from the course of the Delaware, and is capable of being united by a navigable canal, which would connect the inland navigation from Susquehanna, with the Delaware, and by the Raritan with the Hudson.

These several streams which pay tribute to Susquehanna alone, are computed to water a space of *fifty millions* of acres. Let any reflecting man for a moment ask himself the following questions—and endeavour to reach as correct a knowledge as circumstances will admit of the facts which they involve :

How many of these millions of acres are now uncultivated from the want of a certain and easy carriage of produce to market ?

Could the produce of these lands be carried to the market of Philadelphia, or to the numerous ports on the Delaware and Chesapeake, would not the farmers of Pennsylvania flourish in abundance and wealth ?

Would not every acre which is now worth five dollars be worth from ten to fifteen or more, if there was established a secure inland navigation which would enable the farmer to transmit his produce at any period of the year to the best market at a small expence ?

These questions every man should examine who has either property in land, cultivated or uncultivated ; or is in commerce of any kind ; and those who are interested in the prosperity of the state either by the common motives of a generous patriotism and humanity or by the interests of industry, will perceive that there is no object which calls so earnestly and

sally for the public regard and the support of the legislature as the speedy adoption of means by which the rivers and creeks of this state may be rendered navigable for vessels capable of conveying produce to market.

The greatest difficulty which perhaps yet remains in the way of accomplishing all these objects, is the want of some plan which by equally promoting the general interests of the state at large, would give neither ground for jealousy nor suspicion to any particular part of the state. Interested men have continued for some years past to excite a most extraordinary jealousy between the western and eastern parts of Pennsylvania; and in fact this has in numerous instances produced the unhappy effect of injuring the whole, without promoting the advantage of any.

For several years past an opinion has been propagated with great industry and success in the western parts of the state, that the interests of the people beyond the Alleghany are different, and at variance with those of the people on this side of the mountain. This prejudice like so many others has been carried to such an extreme, as to cause hundreds to believe that any thing which benefits the one section must be prejudicial to the other.

It is difficult to discover the source of an error so repugnant to the interests of society and of strict morality; and it must be attributed only to some cause which conceals at bottom an envy of the unexampled prosperity, or an hostility to the happiness of Pennsylvania and her policy. Very unfortunately the natural condition of the country, with respect to the roads and other means of communication, helped to foster these prejudices; the roads at some seasons wholly impassable; many of them at all times difficult and dangerous; rendered the intercourse between the citizens of the same state, as difficult and the intervals almost as long, as between those of the remotest

parts of the union. The difficulties of commercial intercourse through the same causes were almost insuperable, and in general incumbered with so much delay, labor, and expence, that the produce of the country became useless when the price was reduced to such a rate as to leave but a small profit after the expence and labor of carriage.

For a long time the prospects of the Ohio navigation helped to foster the enormous idea of separate interests existing in the same state. Time will no doubt render that noble river a most important outlet for the produce of Pennsylvania, but experience has already shewn the citizens of the western country, that the speedy and certain market of Philadelphia, at a low price would be preferable to the long and precarious market at New Orleans. As it is here only proposed to point out the true interests of the state at large, any enumeration of particular disadvantage in the Ohio and Mississippi trade makes no part of the object of this pamphlet; the wishes of the writer being rather that the inconveniencies of these rivers may be overcome by the enterprize and liberality of the neighboring states; for whatever selfish interests or narrow policy may conceive to the contrary, it is demonstrable that in a country like ours, the prosperity of every part must contribute to that of all the rest; and that even if the Ohio and Mississippi could be made navigable from Pittsburgh in ten days, it would greatly conduce to the prosperity of Philadelphia and the other ports on the Delaware and Chesapeake.

In truth the great interest of every agricultural as well as of every manufacturing country, is to obtain a speedy and cheap access to as great a number of markets as possible. Every man must perceive at once that the number of markets is like a number of buyers, and the owner of produce can obtain a better price where there are many purchasers, than where there is only one.

Here then it is perceptible that in proportion as good roads and above all of water communication encrease, the means of transporting goods are rendered speedy, and cheap, the number of markets are also encreased.

A bill has been bro't forward for establishing a turnpike road between Sunbury and Philadelphia, or rather between Sunbury and Reading, for which surveys have been made several years past. A singular narrowness of policy creates opposition on both sides of the question on this road. One party are for confining the road wholly to the route from Sunbury to Reading, because they vainly conceive that Reading must then become the depot for all the produce that comes that way. So far as the object of drawing commerce to Reading is contemplated it is fair; but they never call into recollection that the price there will always depend on the difficulty of *carrying it away* from thence to the place of consumption, and that if those who wish to export from New-York, Philadelphia, or any port on the Delaware, go to Reading to buy, they will count the cost of carriage from thence to the port of export.

The other party are opposed to the establishment of the road between Sunbury and Reading, unless the road is extended the remaining eighteen miles to Perkiomen bridge, and thereby opening the continued turnpike through Germantown to Sunbury.

But though the former are selfish and the latter liberal, in their respective views, they each mistake the true policy. Those who wish for a monopoly at Reading, vainly suppose they can retard the progress of society and bind it by the feeble ties of a little town interest; the latter do not perceive that they ought to agree at once to the establishment of the road from Sunbury to Reading rather than do nothing; because certainly in the first instance, even so much improvement would be a public advantage; and in the second,

that the remaining eighteen miles would be more easily accomplished at a subsequent period, for the people of Reading would speedily discover that good roads to carry away are as necessary as good roads to bring produce to the place of sale.

These subjects are so recent and familiar that they must be at once conceived and applied to interests and views more extensive. They will enable any reflecting man to perceive at once, that an improvement made here to-day will encourage and promote another in a neighboring or a distant place to-morrow, and that in fact by promoting a part the improvement and advantage of the whole community is accelerated.

These reflections go in a great measure to answer the propositions stated in pages 8 & 12; they shew that the difficulties which have prevented the opening of the roads and waters of the state arise from imaginary and false notions of local interests, that the only means required to encrease the value of lands, and render profitable those millions of acres which are for the most part unproductive, is to open to the whole state, and to every part of it the most prompt encouragement and easy communication.

Much is indeed to be accomplished, but prejudices, the mistakes as to the true nature of state interests, and false calculations of narrow local policy, have been the principal causes why Pennsylvania has not effected so much as she might.

It is nevertheless but justice to state that some other causes have interfered with the interests of the state. The baleful spirit of speculation, which at one period menaced the country with universal corruption, and to undermine the foundations of society itself, tended greatly to alarm the jealousy of the people. Abuses of the bounty of the legislature, in many instances that might be named, had a similar effect. But yet a reference to the laws passed at different periods

for 20 years past will shew that at no period has the legislature been wholly indifferent to the promotion of inland navigation and public roads. The sums granted in 1791 and 1792 for improving the navigation of rivers and creeks amounted to upwards of 11,000 dollars; and the amount for roads in the same period to upwards of 13,000 dollars. In the two succeeding years 1793 and 4, near 12,000 dollars were appropriated for improving roads only.

The amount granted in latter years is not within reach at the moment of writing; nor is it indeed necessary, since the facts here stated are sufficient to shew that the legislature have not been indifferent nor insensible to the general interests of the community. The bill for establishing the great turnpike road to Pittsburgh, proves that the legislature of the present day, perceive that it is time for Pennsylvania to draw her remote parts together, by the means of good roads, and that they comprehend correctly the interests which the whole state must derive from the improvement of every portion thereof.

Though the opening of the communication between every part of the state may not be practicable at once; yet it will be interesting to take a view of the actual distance and difficulty, to be encountered in opening a communication by water between even the most remote parts of Pennsylvania.

It appears from surveys made many years past, some of which were by the late David Rittenhouse, some by Mr. Adlum of Maryland, some by Mr. Howell of this city, others by Mr. Weston, an English engineer; that the whole distance of a navigation by water between Philadelphia and Pittsburg would be 426 miles, in which there would not be any interruption but one portage of 18 miles at Conemaugh.

			TOTAL.	
	Miles.	*Chains.*	*Miles.*	*Chains.*
From the tide water of Delaware at Philadelphia to the Tulpehoken,	61	00	61	00
Up the Tulpehoken to the Canal laid out and commenced by the Schuylkill and Delaware company,	37	9	98	9
Length of the Canal and summit level,	4	15	102	24
Navigation of the Quitapahilla creek to the Swatara,	15	20	117	44
The Swatara to Susquehanna,	23	00	140	44
Susquehanna to Juniata,	23	28	163	72
Up Juniata to Huntingdon,	86	12	250	4
Up Juniata from Huntingdon to Poplar run,	42	00	292	4
Portage to the Conemaugh,	18	00	310	4
Down Conemaugh to Stoney Creek,	18	00	328	4
Down Conemaugh and Kiskeminetas to Alleghany river,	69	00	397	4
Down Alleghany to Pittsburg, at the confluence of the Ohio,	29	00	426	4

The land distance between Philadelphia and Pittsburg is 320 miles; so that the natural meandrings of rivers and creeks do not encrease the water distance more than an additional third. A fact suggests itself on this view which must speak to the judgment of every man. Flour is brought to the market of Philadelphia from Richmond in Virginia, a land distance of more than that of Pittsburg; but the navigation is treble the distance, and attended by all the hazards and obstructions of rivers and sea. The barrel of flour brought from Richmond sells at the Philadelphia market at a profit of three to four dollars, after paying a freight *only of one dollar*; while the flour sent by water from Pittsburg, must pass over the dangerous falls of Ohio, and to the mouth of that river about 1070 miles, and then down the Mississippi to New Orleans 1100 miles further, to find a market, and paying a freight

proportionate to the distance and the danger, with all the additional risques which experience has shewn to be too real from the climates through which it passes; while it is certain that if the navigation between Pittsburg and Philadelphia were accomplished, the freight and expences would not amount to as much by one half or two thirds, as the charges between Pittsburg and New Orleans; and with this additional advantage, that the goods now brought from the seaboard, by waggons, and which cannot be had by the Ohio, could return at the same cheap rates by the inland navigation.

The importance of good roads is already so obvious that the prejudice which formerly prevailed against turnpikes has been totally removed by the experience of their utility. The direction of general attention to the improvement of river and canal navigation, is only required to put into activity the industry and generous dispositions of the state. Men who are convinced that it will encrease the value of their landed property, or procure a double price with a reduction of one half or more of the expence of carriage will require no other incentives.

But when they reflect that no plan which can be adopted will so soon settle their vacant lands, on the Susquehanna or any of its branches, as an easy communication with the market of Philadelphia. I am astonished at an hours delay in a plan which has been ascertained to be so easily effected as the junction of the Delaware with the Schuylkill, and the Schuylkill with the Susquehanna; when once effected 2 or 3 families may go up with all their furniture and conveniences about them to the settlement, in a single boat, and even retain it till they have made a comfortable establishment on their new acquired property; the ease and certainty by which they may afterwards be supplied with every convenience of life, gives them a confi-

dence, which will permanently fix them. How many instances have occurred of people returning back from the new country in consequence of the difficulties they have experienced on the journey, and how many even after overcoming those difficulties, and reaching what in their ideas was a land of promise, have come back heartless and disappointed from a pathlesss forest without the appearance of one ray of comfort, this has had not only the bad effect of driving them away, but detering others from attempting a like adventure.

It was calculated in 1790, that in that year 150,000 bushels of grain passed down the Susquehanna to Middletown at the mouth of Swatara, which paid one-third of a dollar per bushel land carriage to Philadelphia at that time. It is presumed that the quantity must have at least doubled in the last fourteen years; which would make the present amount which passes the same course 300,000 bushels—taking for granted that the improvement of roads has prevented an encrease of price since that time to the present, and that a bushel of wheat may be brought from Harrisburgh to Philadelphia for one-third of a dollar, the cost of land carriage even for that distance on 300,000 bushels, would amount to 100,000 dollars.—

Estimating the bushel of wheat at 56 pounds weight, two bushels make 112 pounds or the mercantile hundred, the above number of bushels would amount to 7,500 tons weight, what then would be the probable expence if the same amount could be carried by water to Philadelphia, say by the Schuylkill and Susquehanna and the Susquehanna and Delaware canals. This may be properly taken as a fair datum, because the distance is well known, and as it in fact forms the grand link which must be completed whenever natural spirit and a salutary policy nobly undertakes the accomplishment of the whole

navigation to Pittsburgh; or whenever the effort shall be made to effect that part of it.

Harrisburgh is 100 miles from Philadelphia by land, the line of the canal referred to is but 32 miles more. But of this distance there are of the course 46 miles of the natural river, upon which no tolls could be levied; the toll would then be to be levied on 86 miles of the whole way from Harrisburgh on the Susquehanna to Philadelphia—

Land carriage from Harrisburgh, 100 miles.

1 bushel of 56 pounds, - - - -		33 1-3
1 cwt. - - - - -		66 2-3
7,500 tons, - - - - -	$ 100,000	

Water carriage, 132 miles.

Toll at one dollar per ton for each canal, on 20 tons, or on a boat load, 40 dollars, suppose 375 boats,	15,000	
To each boat a man and boy, and a horse to manage the boat ashore—the man's wages five days, - - - -	$ 5	
Boys wages at 75 cents, - -	3 75	
Horse wages, - - - -	5	
	13 75	
Say for 375 boats, - - -	5156	
Boat hire at a dollar per day for 375 boats, 5 days each, - - - -	1875	
	22031	

Here every allowance that can reasonably be supposed, is made for the water carriage; in short the allowance for labor and hire is in all particulars high as the price of labor in Philadelphia, while the expence attending waggon carriage, and the number of horses and hands employed do not appear in the estimate; and yet the difference in favor of water carriage in preference to the cheapest land carriage amounts to 77,969 dollars, upon the conveyance of one year's produce of wheat alone from Harrisburg to Philadelphia.

These various data are all assumed without making any allowance for the enhancement of land carriage at particular seasons; nor for the advantage which would be derived to agriculture by retaining on the farms the number of men and horses which are required for land carriage, fourteen men, fourteen boys, as many horses, and 5 days would be adaquate to the service of the water carriage; while it would require 134 men, 804 horses, and five days on an average of seasons, to convey the same quantity by land.

Adverting to the gain which must arise from liberating so great a number of horses and men, to be employed in active agriculture, we shall find the advantages are such as no man can either consider as trivial or with indifference.

Why then with such facts before our eyes, has Pennsylvania left so much to do, in the improvement of her interior, and the promotion of the agriculture and wealth of her fortunate soil?

Perhaps the impediments were never so few as at this time. Certainly the incentives to activity were never so many. The extent of country between Philadelphia and the Susquehanna, besides all that is at present under effective cultivation, taking both sides of the canal, and assuming that 10 miles on each side would derive the requisite advantage from it; leaves little doubt that 1,000,000 of acres would be added to cultivation, its produce conveyed along our waters, enlivening and enriching the country through which it passes, and giving to our seaports wealth by which the farmer would be rewarded for his labors, and the commonwealth enriched and strengthened.

Supposing that this million of acres should be added to our cultivation; that each acre should produce only 10 bushels; these 10 millions of bushels, of 56 pounds each, amounting to near 250,000 tons weight, would be added to our agricultural riches.

Every man can make his own calculations upon facts like these; but there are others which must be taken into the computation, in order to appreciate the advantages of inland navigation. The conveyance which it will afford to the weighty and valuable productions of quarries and mines; to the lead, iron, and copper ores, otherwise of no value from their distance, and the high price of carriage of the rude material; our marble, free stone and coals, which every day's progress in society renders more necessary and more valuable, will produce the most beneficial effects. One of the richest salt mines of England was discovered in digging a canal, and perhaps that country owes to the truly noble enterprize of the Duke of Bridgewater, in establishing inland navigation, a considerable proportion of that prosperity which her commerce and manufactures have enjoyed during thirty years past.

But it will be said by timid, or thoughtless, or selfish reasoners, that our country is too young for the accomplishment of such undertakings. Such objections, however, would have been equally applicable twenty years ago to our commercial enterprizes by sea. We are now in point of tonnage the second mercantile people, notwithstanding the rivalry of the most potent nations on earth, but in canals and internal improvement we can have no rivals. The want of laborers is the best argument in favor of canals. Whence are these resources derived, but from the exchange of our productions and those of other nations; by a prudent policy, and great enterprize and industry. In what undertaking of Pennsylvania has she fallen short of her neighbors unless in the single article of internal improvements, in which New York has become her successful rival, as South Carolina promises to surpass both in the magnitude of her undertakings.

Let us now consider whether the construction of navigable canals to the extent already mentioned, or even to a somewhat less extent, would not operate sufficiently to produce the most desirable consequences. The average rate of land carriage in this country is 3*s*. 4*d*. per ton per mile, and the charge upon canals if built at the public expence would not be more including the freight than 2 pence per ton per mile, and even much less for great distances, viz. such a sum as will suffice to pay the freight and keep them in repair with a small profit to the undertakers. —Thus the expence of carriage on canals will be only one-twentieth of what it costs by land—supposing then that one acre of wood land would produce one hundred tons of timber for either fuel or for exportation, which I consider moderate as the forests are rather heavy in the western country, and that each ton weight was to be carried 24 miles on a canal, besides the river navigation by the substitution of canals for land carriage, there would be a saving of 3*l*. 16*s*. per ton, or one hundred times that sum per acre —but it may be argued that the timber would not pay to be conveyed by land: I then say it would at least pay ten-fold—nor does it rest here, for millions of acres would soon be turned into cultivation, and then the benefit would be in perpetuity, as suppose one acre would produce 10 bushels of grain, the profit or difference of conveyance between land and water would be equal to 19 shillings on twenty-four miles, an annual bounty absolutely to the farmer for every acre he brings into cultivation. In whatever light we view this subject, either as a means of communication of clearing the lands, or cultivating them when cleared, or settling them with inhabitants, and for a cheap, certain and easy mode of supplying the cities with fuel or the merchants with the produce of the country, it is equally applicable and certain, and the farmer would be supplied with all the conveniences and ma-

terials for cultivating his farm, building his house, or conveying the necessaries or comforts of life to him and his family—in short it would be difficult to appreciate in all its branches the consequence of this, and those who shall be the means of producing such a blessing to this country, will be rewarded with the consolation that they will contribute more to the happiness of their fellow creatures than all the heroes of antiquity.

A common mode of opposing domestic improvement is to count the cost only. Independent of the consideration that most improvements have been carried on by associations of private individuals, without any public aid or donation, such as that of Carolina; there is another answer to this mode of opposition; to the price of a barrel of flour at the Swatara, it would be no doubt proper to add the price of carriage to the Philadelphia market, in order to ascertain what it should there sell for, so if the difference between the expence of the present mode of carriage, and that by navigable canals and rivers, is sufficient to justify the making the canals, that difference, and not the mere amount of toll is to be regarded.

To what will be the cost, the intelligent merchant would add what will it also produce? It is the *receipt*, in proportion to the expenditure, and not the expenditure itself, on which men who estimate things correctly will dwell. If in expending one hundred dollars nothing is to be gained, then it had better not be expended; but if by expending one hundred dollars four hundred can be gained, surely it would be folly most excessive to be deterred by the expence. Yet the barely counting the cost, without regard to the advantage of internal improvements is no less absurd; for surely the addition of a million of acres to cultivation, and the enhancement of the selling value of land in consequence of such improvements ought to be calculated in the account.

Nations that have preceded us in experiments of this kind, have furnished us with the most flattering results; and in a country like ours, where our population is so limited, and where labor is necessarily high, *labor* and *time* saving machinery ought to be more zealously encouraged than in those countries where population is abundant and the price of labor low; just in proportion as the state is benefited, it should encourage so useful an undertaking as a canal, languishing for support; it is their duty by every means in their power to nurture and bring it to a state of perfection; without attending to the advantages which the subscribers may derive by gifts of money, or other grants, the only thing which should be attended to is to keep the toll as low as possible—nor should they be proprietors of a canal—Louis XIV. when he finished the canal of Languedoc, which has been of more service to his country, than all the wars, victories, and other exploits of that great man, gave it under certain restrictions, to Ricquet, the engineer who planned and finished it.

Every principle of state pride, of public spirit, of general and individual interest, should engage in the promotion of roads, canals and bridges, in whatever direction enterprizing men and industry should attempt them. No local policy should check enterprize *here*, because a similar work was not to be carried on there at the same moment There must be a beginning somewhere; and the accomplishment of improvement in one place will necessarily tend to encourage it in others. Such has been its progress every where. The Bridgewater canals of England were originally contemplated but for a short space, to facilitate the transportation of coals; the success of the experiment, opened to that active and industrious nation, resources before unknown to them but by theory; the example in practice was such, that the whole nation gave its voice in favor of it, and one of

the canals of England extends above 150 miles, independent of several others which flow into it, one of which is 46, and another 26 miles in length.

Considerations of this nature might be multiplied without end, and all of them cogent as to the efficacy and utility of inland communications, particularly by navigable canals, and the removal of obstructions in the main rivers.

Perhaps it may be excusable while on this subject to anticipate with a generous delight the period when America will exhibit a spectacle of interior improvement, more worthy of human nature than those of China, more conducive to genêral security than those of Holland and Venice, and equally magnificent and more useful than those of Languedoc and the Rhine; the execution of which were intended rather as monuments of regal vanity than of utility to mankind.

May we not anticipate the future navigation from the St. Lawrence, by Lake Champlain to Lake George and the Hudson; from the Hudson by the Raritan to the Delaware, thence by the lower canal into the Chesapeake, thence southward from Chesapeake through the Dismal Swamp and Albemarle and Pimlico sound, also inland by the junction of the Unadilla with Delaware, through the waters of New York, and by the meandrings of the Susquehanna thro' the Schuylkill, by the sources of the Tyoga and Alleghany. The navigation of Lake Erie might be opened in two admirable positions for the commerce of the surrounding country, and enterprize would gradually unfurl the canvas of commerce on our inland seas lakes Ontario and Superior, and even on the vast chains of lakes and rivers that form the reservoirs of the Mississippi, Missouri, and river of the West. While the waters that flow to the Atlantic would have their natural advantages greatly multiplied in being conducted by the hand of art, "*to scatter plenty round a smiling land.*"

But let us not in anticipating the glory and the prosperity of our posterity, forget what is due to our contemporaries, nor lost in admiration of future improvements of our country, omit to perform what our interest and our duty requires of us. Let us turn our attention and our activity to what it is in our power to accomplish in our own day, and to our own profit and reputation ; for he must be a sordid being indeed who does not delight in that which redounds to the credit or welfare of his country.

There are two points which lie immediately within our power, but which have languished through causes that whatever they may be, ought no longer to prevail. The first is the canal from Philadelphia to the Schuylkill at Norristown, which embraces objects of very great importance to the state at large.

First, of a canal to receive and transport produce from Reading, by the course of the Schuylkill to Philadelphia by water, and to carry back merchandize for the interior in the same manner. From 70 to 100 waggons pass at certain seasons of the year daily by that road with grain alone to the Philadelphia market. What would the convenience and advantage be, were the navigation completed, and a branch erected to communicate with the Delaware and Susquehanna? Secondly, the abundant supply of the city with water; Thirdly, to afford a supply of water for mills, and other machinery necessary to the manufacturers of paper and flour, the sawing of stone, timber and scantling, exactly to the size wanted by the ship carpenters—and fourthly, a grand bason might be formed with graving docks on the low ground at the mouth of the Cohocksen creek, where a navy yard was once contemplated, and where the produce of the Susquehanna would find a capacious depository—the masts, spars, pitch, turpentine, &c. water borne, might be delivered along side the ships at the very mouth of the canal.

The first branch of the undertaking should be the completion of the canal from Norristown to the city of Philadelphia; the second would be to clear the stream of the Schuylkill from Reading to Norristown; and then proceed to complete the navigation up the Tulpehoken creek to Lebanon, or by a still water canal, as was recommended by Mr. Weston, an engineer of great skill and abilities.

A still water navigation is I imagine absolutely necessary from Lebanon to the Susquehanna, rather than to proceed by the Quitapahilla creek and the Swatara, because for many years to come timber will be a considerable article of commerce, and it may not be easy to conduct it up those streams to the head of the Quitapahilla.

When this is stated as the secondary object, it is not meant to be considered as subordinate in importance to the other. The fact is they both are links of the same chain, and the success of one will determine the certainty of the other; but one should be completed before the other is attempted; to shew the utility of inland navigation even upon a small scale, besides there can be no deviation in this line, as it is taken up at a certain point, and confined to its level between the river Schuylkill and its bank, and laid out by Mr. Weston, who states it to be judiciously planned in one of his reports.

It may now be necesary, in these remarks, to demonstrate beyond the possibility of a doubt, that the encrease of water-carriage in this country is, of all other improvements, the most essentially requisite to its present and future prosperity.

The great *desideratum* in every country, the chief object of every good statesman, is to excite the industry, and thereby augment the productive labor, of its inhabitants; for it cannot be denied, that a nation is powerful, prosperous and happy, in proportion

as it is industrious. Now, no individual will be more industrious than he is, unless by becoming so, he can encrease the sum total of the necessaries, and conveniencies of life, he has occasion for—or, in other words, unless he can exchange the produce of his labor for a greater portion of those necessaries, and conveniencies, than before. To raise the exchangeable value of what he has to dispose of, in order to procure the means of living, is therefore the grand secret of calling forth his industry. If it produces a higher price than before, if it enables him to save more, with a view to the future, or to spend more, and live better, at the moment, and if these inducements are permanent, and sufficiently inviting, they will, by degrees, prevail over his natural listlesness and inactivity, and produce in him the habits of lasting and encreasing industry.

What is true of an individual, may be applied to all the inhabitants of a state, who depend for their maintenance on labor of any sort. Encrease the exchangeable value of the commodities on which their exertions are employed, and in the same proportion will these exertions themselves encrease. The value, however, for which the rude or manufactured produce of a country can be disposed of, depends entirely on the demand there is for it, either in the country itself, or in some other; and to encrease that demand, to open new markets for it, whether home, or foreign, is the most effectual means of augmenting industrious exertions.—But the demand for any commodity, at any particular spot, must always depend on the relative cheapness it can be afforded for at that spot; since the cheaper any commodity is brought to market, the surer vent it is likely to find. Here are two steps, therefore, in the grand attempt of increasing nationa industry, that seem to run counter to each other. The

quantity of industry can only be augmented by rewarding it more liberally than before ; and yet the price, at the market, where the produce of that industry is to be disposed of, ought not to be encreased, but rather diminished, in order to secure a constant vent for that produce, and a growing demand for it. How are these two seemingly contradictory objects to be obtained together ?

In order to answer this question, it is necessary to consider, that the price of all articles of the growth or manufacture of a country, resolves itself into two parts, namely, into the expence of growing or manufacturing them on the spot where the industry is exerted, and into that of conveying them to market, where they are to be exchanged. These two component parts of the price of commodities may, in different circumstances, bear all the various proportions to each other that can possibly be imagined. In some articles, the expence of carriage may bear so small a proportion to the entire value of the commodity, as to open the whole world as market for its sale. Such is the case with diamonds, gold, silver, fine furs and drugs, and such like precious productions ; and with some valuable and exquisite species of manufactured goods. In other articles, the expence of carriage to market may be so very great, in respect of the value for which they would exchange when brought thither, as either to render them of no value at all, or to confine their market to a small distance around the spot where they are produced. Whether a free stone, slate, marble, or limestone quarry, whether a coal-pit, or a marl pit, whether ores, or minerals of various kinds, or even entire forests, covering immense tracts of country, are of no value whatever, or can at all be brought to market, depends entirely on the proximity of that market, and the expence of carriage thither. All the other cheap, and bulky productions of the vegetable kingdom are, equally with

timber, dependent for their value, upon the facility of their transport to a steady market, and for want of this, may either be entirely neglected, or exchanged for a hundred times less in one particular spot than another. In the ruder manufactures too, the expence of carriage enters as a very considerable article in their value, whether of the different raw materials to the places where the goods are wrought up, or of the goods themselves to the places where they are sold.—In short, it is unnecessary to multiply instances to shew, that by considerably reducing the price of carriage, the various prices of all weighty and bulky commodities will be reduced in proportion, many will become saleable that before had no value whatever, and not only a reduction of the market price of manufactures and produce, will thus be necessarily brought about, but likewise an augmentation of the quantity and species of the raw material, upon which human industry is exerted.—By diminishing the expence of carriage, then, it is evident, that the produce and manufactures of a country will come much cheaper to market than they did before, so as to occasion a constantly encreasing demand. All this is the result of experience, and the effect of time; and though one country may no doubt, avail itself by imitation of every improvement that has been found beneficial in another; yet it should always begin with these, the success of which is infallible, and does not particularly depend on the genius, situation and disposition of its inhabitants, which may perhaps be but ill adapted for other attempts. Among these, the idea of lessening the carriage of commodities, and thus bringing them cheaper to market, is obviously the most simple; and as far as it is capable of being realized in any country, is the most solid and durable improvement that can be made in it, and one of the first that should be attempted.

Of the means invented for transporting commodities, there are four different kinds, each succeeding one more perfect than the foregoing, and corresponding to the different degrees of civilization at which mankind gradually arrive. Those savage tribes, that subsist by *hunting* and *fishing*, are obliged to carry along with them, *on their backs*, all the few moveables they possess. When they advance into the *pastoral state*, by the acquisition of tame animals, some of these are converted into *beasts of burthen;* and the possession of much greater wealth than could be accumulated or transported, in the earliest and rudest stage of society, is thus rendered a possible case, and accordingly realized. When the *state of agriculture* is introduced, and private property in land becomes thoroughly established, a second improvement in the mode of transporting commodities, the invention of *wheel-carriages*, generally follows at some distance of time; and along with it, the necessity of constructing public roads and bridges, upon which these carriages may run. Coeval with these improvements, however, and preparatory to the *state of commerce*, the last and most perfect situation to which mankind have attained, the discovery and perfection of navigation, and *water-carriage*, take place by degrees, and present mankind with the last, and most advantageous method of conveying their redundant commodities to each other, by which the most distant nations of the earth are formed into one great mercantile community. The superiority of water-carriage, over every other kind of conveyance, is so very great, that those countries only which enjoy its advantages most extensively, have been enabled to reach the highest summit of civilization and improvement, and have always been the first to rub away the rust of barbarism, and to set an example of high acquirements to the rest of the world. The greater relative extent of sea-coast a country possesses, particularly if it abound

in navigable rivers, reaching far into the interior; in the same proportion is it capable of underselling its neighbours, by the cheapness of water-carriage, in the same proportion is its industry called forth, by the pre-occupation of the market. The history of trade and commerce, in every age and nation of the world, is one continued elucidation of these principles; and so far from the insular situation, the indented coast and navigable rivers of Great Britain being among the least, that they are obviously the principal concurrent causes of its present unexampled prosperity. But human ingenuity has gone much farther than merely to avail itself of those inlets to navigation, with which a country is supplied by nature. Art has proceeded so far in some countries, such as China and Holland, as to diffuse the benefits of water-carriage over a great part of their surface by means of *canal navigation;*—and though England, by her rivers, possesses great national advantages, in the carriage of all bulky and heavy commodities, yet these are exceedingly encreased, of late years, by multitudes of navigable canals, by which the remotest towns communicate with each other, in a much more perfect manner than those of any other country of Europe, except the Netherlands.—The prosperity of England has risen much more rapidly, since these communications were established, than it ever did before, in an equal space of time, notwithstanding the heavy tolls with which its canal navigations are burthened, the gain arising from which, was the principal inducement to their being accomplished at all. There is probably no other example to be met with in the entire course of history, of a nation being furnished with an almost complete set of navigable canals, by the enterprize and adventurous spirit of individuals, as works of this nature have, in all other countries, been carried on chiefly at the public expence. The previous existence of a great internal trade, sufficient

to refund with profit the expence of construction, was no doubt, the cause of those singular exertions in Great Britain; and if ever the state of the finances of that country shall enable it to wipe away entirely the numerous tolls, with which its canals are loaded, it may easily be foreseen, that such a measure would be attended with consequences still more beneficial, than any that have hitherto resulted from the imperfect reduction of the expence of carriage on these navigations, in their present state.

As we do not, in this country, possess a degree of internal trade, sufficient to prompt individuals to undertake the construction of canals all over the country, as an object of speculation; and as we cannot therefore expect to be furnished with inland navigation, precisely in the English manner; unless we chuse to forego entirely, or at least to defer to a very remote period, the benefits arising from them, we must follow the example of the rest of the world, and endeavour to have them principally constructed at the public expence.—Let us, therefore, proceed to consider both *generally*, from the nature of the thing itself, and *particularly* as arising from the circumstances and situation of this country, what these benefits are; and afterwards whether it would be adviseable to appropriate part of the income of the state for their attainment.

Were the expence of constructing and constantly repairing canals, thirty times greater than that of making roads and keeping them constantly in repair, the former would stand the public as dear as the latter, and there would be no diminution of the expence of carriage. But every body knows that this is not the case. Instead of being thirty to one, the original expence of construction cannot well be averaged at more than five to one greater in canals than in roads; —but to counterbalance this, the expence of keeping canals in repair is exceedingly less, in proportion to

the sum necessary for their construction, than what is required to the repairing of roads. A canal will last for an indefinite period, (if well built at first,) by merely cleaning it and repairing the wood-work from time to time; but a road requires to be new made after the lapse of a certain number of years, or the expence of repairing it amounts, in that period, to that of making it entirely anew. This constant recurrence of expenee, must, in time, make the latter as expensive to a nation, nay, vastly more so than the former can possibly be; and a century in the existence of a nation, is not more than a year or two in the life of an individual. Thus suppose that a road requires to be new made, (or that the expence of repairs is equal to that of making it anew,) every ten years;—after five repetitions of this operation, that is, in 50 years, it costs the nation as much as a canal would at first. And though the compound interest of the original sum expended on the canal would, no doubt, keep it above the sums laid out on the road, after five such operations, yet, extend the number of these operations to twice five, and so on, and the compound interest of the various sums they cost, superadded to each original expence, would at last exceed, *in any proportion whatever*, the total amount of the expence of the canal. It may therefore, with safety, be affirmed, that in 50 years time, every mile of road shall really have cost the public a much greater sum than each mile of canal, though it be near thirty times less useful for the carriage of goods than the canal would be; and that in two or three hundred years, (which are scarcely equivalent, in the duration of a state, to so many weeks in the life of a man,) a sum so immensely greater, as almost to baffle calculation.

It may therefore be assumed, as a certain truth, that, provided there be a rational expectation of completing a system of canal navigation in this country,

the expence attending it ought to be cheerfully supplied by the public; as well for other reasons about to be mentioned, as because it is by far the most useful species of employment that can possibly be devised; and no excuse whatever ought to divert the attention of our government from this first of national objects, till it be thoroughly accomplished.

Upon the whole, it may be affirmed, that from the various favourable levels of this country, from the plenty of water with which it is every where supplied, and the comparatively great rivers with which it abounds, there is not a country in the world of equal extent, that is more capable of being intersected by multitudes of canal navigations, than the United States.

The *advantages* that would accrue to this country, from the execution of such a plan as the foregoing, are so numerous and various, and in some degree obvious, that one is altogether at a loss where to begin in the enumeration of them.—Agriculture, however, would be the first to feel its beneficial effects; and for *two reasons*, the encouragement and increase of tillage is, of all other improvements, of the most vital importance. The first is, that the number of her people being comparatively small in proportion to her extent of territory, all attempts to introdnce among them the finer kinds of manufacture must fail; the coarser ones only can succeed; and the raising of corn is an employment to which alone the greater part of them are accustomed, and in which, therefore, they can soonest, and most easily be improved. Whatever manufactures depend immediately on the soil of the country for their *primum*, ought no doubt along with agriculture to form an object, yet still a secondary one; those finer species of fabrics, when the country becomes more populous. By these regular gradations, and in this very order it is that the circumstances of a country are gradually, and entirely chang-

ed; that industry, wealth and population are encreased, capitals and skill created, and the inhabitants insensibly converted into a perfectly well employed and productive community.—Yet still is agriculture the first step in this process, the foundation of all commercial greatness; and in this country, in its present unimproved state, the most *imperative* object of public attention.

But to enumerate these other benefits and advantages, is really a task of the most difficult and laborious kind, entirely arising from the unbounded extent of the subject. Besides corn for export, how many other species of heavy and bulky commodities, both native and foreign, must, the native be carried out of, and the foreign brought into the very heart of this country; on all of which, a reduction of the rate of carriage to one-sixth of what it costs at present, would afford the latter exceedingly cheaper to the consumer at home, and encrease the demand for the former abroad, by lessening their price in the foreign market? Would not the exchange of the products and manufactures of the different parts of the country with each other be extended and promoted, in a still higher proportion than its intercourse with other countries—and that most beneficial of all the branches of commerce, the inland trade of the country, be thus quickened and increased in a most eminent degree, and in thousands of instances, newly created, where it never existed before? Would not the American farmer multiply his produce, acquire much cheaper the materials, upon which his industry is exerted, and the price of his produce encrease? Would not his application to his business be thereby excited, and his gains encrease? Would not the circumstance of our being able to supply other countries more cheaply with the native articles we send to them, while the foreign price continues nearly the same, enable us either to put the difference in our own

pockets and thus enlarge our profits, or to encrease the quantity produced, by the growing competion for these profits? In short, it would be endless labour to enter fully into particulars on this fruitful subject, which embraces almost the entire circle of intercourse that man holds with man. The following short summary or heads of argument, must for the present suffice, to enable the reader to form some idea, however imperfect, respecting it.

By an extension of inland navigation, the price of provisions and produce of all kinds would be kept at all times almost on a level throughout the United States. From the borders of the river St. Lawrence to the Floridas, an extent of above fourteen degrees of latitude, the productions of the north would in hot and dry seasons supply the deficiencies of the south, and the countries of the south in return afford to the north those articles of necessity and comfort of which in seasons of uncommon cold or moisture, it can obtain but a sparing or inadequate supply from its own internal produce. Thus a judicious application of human art and industry would be the means of diffusing over all parts of these extensive regions the productions of each, and be an additional cement to the political union already so happily established, and reflect more honor on its authors, and render greater benefit to the United States by the expenditure of a few millions of dollars, than has ever resulted to Great Britain in return for her enormous debt of above five hundred millions of pounds sterling, or to the human race from all the conquests of Cæsar or Alexander.

Great Britain, whose commercial sagacity and pre-eminence render her regulations worthy of serious examination, and her example to other countries of no small weight, has during the last century paid, and yet continues to pay, immense sums in bounties on the exportation of grain—what better, more operative or less burthensome bounty can be conceived than

that which is insensibly as it were given by the operation of canals ; indeed it would be superfluous to shew what is self-evident to the humblest capacity, that if a farmer who at present must pay one dollar for transporting a barrel of flour to a seaport is enabled to do it by means of a canal for fifty cents, he in effect receives a bounty to the amount of the difference between these sums. Ireland, in consequence of a bounty on exportation, altho' forty years ago unable to supply her own inhabitants, now exports grain in common seasons to the amount of one million of pounds sterling, besides supplying her own population, which has doubled itself within that period.

Not only would the price of provisions be maintained nearly equal every where, and thus the superfluities of one part contribute fully to the necessities of another, but the quantity of these provisions would be prodigiously encreased, and an universal plenty of food be consequently distributed over the entire country.—For,

1. Corn would become more valuable by the facility of its export abroad, and of its sale at home. Of course more land would be turned to tillage; in order to satisfy the encreased demand. The amount of the reduction in the price of carriage, which occasions this, would for a time go principally into the pocket of the farmer. And though a part of it would, at last, be shared by the merchant, and by the consumer in the reduced price of the article, yet a great abundance of corn must necessarily be created during this very process.

2. Not only would more land be turned to tillage, but by the facility of transporting manure, that land would be much better cultivated, so as still more to augment the quantity of its produce. Plaister of Paris, marle, dung, lime, limestone-gravel, sea-sand, sea-weed, and every other species of manure, are all heavy and bulky articles, which cannot be carried to

any great distance except by means of water carriage. The lands in the neighborhood of canal or river navigations would be brought nearer to the marle-pit, the lime quarry, to the coal, culm, or wood, with which lime may be burnt, or to the dung of the different towns or villages, situated at great distances along those navigations. Now all these substances, without water carriage, must be entirely useless, except to those fields which lie in a trifling circuit around the places where they are found. And not only this; but when a spirit of improvement and active exertion is once excited among the farmers of a country, which a scheme of this nature would not fail to effect, they will run greatly beyond the mere numerical advantage resulting from the scheme itself: for one improvement is the parent of another; and it is only necessary to set the idea fairly afloat, to expect from it much greater strides than can be at all exactly calculated or foreseen in the outset. That, for instance, the use of lime as a manure, should not at last become universal in this country, when the fuel can be so easily transported to the limestone, or the limestone to the fuel, by means of water-carriage;—that the English modes of farming and feeding cattle consequent upon this, should not likewise be introduced and imitated here, whether they consist in the most eligible treatment and amelioration of the soil, in the proper rotation of crops, the use of artificial grasses, of winter feeding for cattle, or in attention to the breed of tame animals, and to the quality of wool;—that the American farmer in short, should not at last learn his trade, and avail himself to the utmost of all that variety of manures which water-carriage would bring to his very door, are suppositions which the natural shrewdness and ingenuity of the people of this country will not allow us to entertain. But while this is going forward that quantity must surely encrease prodigiously, and the mode of living of all ranks must

be proportionably improved. The same reasoning may be applied to every other species of provisions, or necessaries, in which the expence of carriage forms a considerable part of their value, and with which the towns are supplied from the country.

3. As only a small part of the draft or cart-horses, at present used for the carriage of goods, would be necessary in conveying these goods by inland navigation, an immense saving in capital to purchase those horses, and in hay and oats, and grass to feed them, must thus be made by the community. That grass and that hay would be used for keeping cattle; and thus the quantity of butcher's meat, whether for home consumption, or for exportation, would be augmented; nor would any diminution take place in our export trade of salted provisions, in consequence of the encrease of tillage to supply the corn market.

Were this country to enjoy the advantages of such an extent of water-carriage as is proposed—though its first effect would be to raise agriculture to an extraordinary pitch of improvement, as above described, yet a nearly concomitant and equal impulse would be communicated by it to our trade and necessary manufactures also.—For,

1. If the materials of manufacture are produced, and the manufactured articles consumed in the country, the former must be conveyed to the spot where the manufacture is carried on, and the latter must next be conveyed to the place of sale. These two places frequently are at great distances from each other: and a raw commodity will often have to travel half round the country before it gets into the retail shop or ware-house, in a manufactured state. If by any contrivance you can bring the barley nearer to the brewer or distiller, the cotton, wool, flax, leather, iron and wood nearer to the msnufacturer, than they are at present, and so on in all our home manufac-

tures whatever they may be ; and if, in addition to all this, you can likewise bring the market where the goods are to be disposed of, nearer to the spot where the manufacturer resides ; you will thus enable him to add to his profits ; and in heavy and bulky articles, such as almost all those are, upon which the industry of a comparatively young nation as America is, must necessarily be employed, that expence, though difficult to be estimated, must yet bear a considerably high proportion to the value of the goods manufactured. But these extraordinary profits acquired by the existing manufacturers will not long be confined to them exclusively. Great numbers of half-employed individuals whom we see lounging in village taverns, will gradually be tempted to engage in each of their respective trades ; idleness will become disgraceful and will give place to industry and enterprize, and that invincible inclination to better his condition, which every human being is actuated by more or less, will thus have scope for exertion, and display itself by a brisk and useful competition. That competition and the encreased number of hands, by greatly enlarging the amount of manufactured produce for home use and exportation, must either diminish the price to the home consumer, who will thus be enabled to use it more freely and in greater quantities ; or if there be a vent for it abroad, will superinduce exportation where it never existed before, encrease it where it did exist, or perhaps be productive of all these events together.—'Tis somewhat in this manner then that water-carriage, when cheap and universal, tends exceedingly to promote the internal trade of a country by facilitating the intercourse of its most distant parts, and to encrease and even create exportation where it never existed before. But the effect of water-carriage goes a great deal farther still : it often creates industry in the heart of a country, no vestiges of which were formerly to be found, and which without it, would probably never have been called forth

at all. Why do we observe in many countries so much idleness and want? Is it not principally because they are too remote from those markets where the *primum* of manufacture is to be procured and the produce of it disposed of? Bring them nearer to both of those places—let the remotest part be brought nearer to the large towns, and it will not be slow to avail itself of that happy change of situation. Why do our quarries of limestone, of marble, and of slate, and our mines of coal, iron, copper and lead, employ so few hands, bring in so little to their owners or the public, and remain as they do in their present neglected state? 'Tis owing to the want of a market sufficiently near and advantageous, to excite enterprise and rouse our sleeping faculties. Why the neglect of our remote woods, where the country is literally a forest which might be usefully employed, and particularly for smelting our iron and other ores? It is owing to the want of water-carriage, which, were it universal here, would render this commodity of so much greater value where it grows, and from the exorbitant rate at which it is now sold in and near our sea-ports, would finally *force* such a quantiy of it as would supply the demand and at last reduce the price. But it is unnecessary to dwell longer on the acknowledged *truism*, that inland navigation evidently tends not only to encrease but even to create internal trade.

2. The same truth is equally evident with regard to manufactures whose materials are derived from other countries, or whose market principally depends on those countries. To connect with all the world, by means of water-carriage, not only the principal inland towns in America, but even every village, every spot of ground situated on the whole range of the navigations proposed, is to give to all those places a command of the *primum* of manufactures, from all parts of the globe, at the cheapest possible rate. The hops, bark, salt, coal, clay, flint, iron, timber, cotton,

silk, leather, flax-seed, pot-ash, wool, dye-stuffs, maple sugar, tobacco, and other articles on which our industry might operate, must, most of them be carried entirely by horse carriage. To diminish the expence of this carriage, upon so many heavy and bulky articles, will be an immense saving to the agricultural and mercantile interests, the consequent encrease of whose profits would, in like manner as was already mentioned, tempt competitors into the trade, and thus encrease the sum total of national industry. On the other hand the existence of internal navigations would enable us to export, to the rest of the world, flour, wheat, rye, Indian corn, rice, tobacco, &c. and every other article of our produce or manufacture, much cheaper than we can do at present; and the price, and demand, in foreign countries, remaining nearly the same, this *vast gain* would centre at home, and produce the same competition, the same encrease of exportation, the same enlargement of enterprize, as if a bounty, to its amount, were actually paid out of the coffers of the state. Indeed the benefits resulting from the substitution of water for land carriage form infinitely the most eligible sort of bounties that a nation can bestow, to rouse the industry of its people; since not only a very great deal of national activity is set on foot, during the construction of canals, by which a certain degree of capital is transferred from the pockets of the rich into those of the laborer, to the great and final advantage of the former however, as well as of every body else; but the owner of the goods exported receives the bounty, in the reduced price of the carriage, as effectually as if it were paid him in money.

A great many accessory advantages, and conveniences would result from a complete plan of this kind, which do not immediately fall under any of the foregoing divisions; of which the following are a few:

1. The number of boats that must be employed on canals, the number of sailors necessary to navigate these boats, which must, the one and the other, be supplied by this country, would give encouragement to shipwrights, and artisans of that description, and accustom a much greater number of our people to the operations of handling a rope, or steering a vessel, so as to give them somewhat of a taste for a sea-faring life, and render them a little nursery for the sea-service. In possession thus of sailors, and ship-carpenters, it would be a strange thing, if the encreased number of trading vessels, belonging to this country did not keep pace with the extension of our canals, and that we should not export our own productions, entirely in our own vessels, and bring back what we want, from other countries, in the same bottoms.

2. The regularity, facility and cheapness of travelling by means of canal boats, that depart and arrive at stated hours, would tend exceedingly to create a brisk intercourse between the most distant parts of the country, would multiply information, and promote industry and trade of every kind. It is not the cheapness of water-carriage alone that recommends it above every other, but the *regularity* and *certainty* of the conveyance.

Wherever canals are universal, the distances of places, as in Holland, need not be expressed in miles, but in time; Philadelphia would be said to be so many hours distant from Reading; by this means the tediousness, and expence of a long sea-voyage are entirely avoided. The certainty that the largest, as well as the smallest parcel of goods, shall arrive at the place of its destination, however distant, with even more regularity than a post office letter does now, must contribute more to excite and maintain a spirit of intercourse, fair speculation, and active enterprize, than one can well conceive, who has never

examined the effects of it in the seven United Provinces, during the period of their prosperity.

3. Besides the quick and regular conveyance of merchants' goods on those canals, the transport of troops, artillery, magazines, and stores of all sorts, would, by means of them, be facilitated in an extraordinary degree, and the expence exceedingly reduced. At the rate of two and an half miles an hour, an army may move on a canal 60 miles within the 24 hours, attended with every thing requisite for immediate action; which is at least four times faster than they can do by land, and at only a small part of the expence. Canals too form, of themselves, strong lines of defence to a country, and supply the means, on any great emergency, of assembling an army suddenly in the most remote parts of it, and would in case of invasion, be the best defence against a foreign or domestic foe.

4. In proportion as water carriage is resorted to, for the transport of goods or the movements of armies, in the same proportion will our public roads be less frequented, particularly by those narrow-wheel'd carts which spoil and cut them to pieces. The diminution of expence in making and repairing our high-ways, arising from the universality of water-carriage, would amount to a very great sum.

The particular advantages that would result to those districts of country through which the canals immediately run, deserve likewise to be mentioned. In the very act of digging them, it is probable that mines may be discovered, or other substances of value, as marble, slate, pipe-clay, fullers-earth, &c. but which might never otherwise be brought to light, through our want of skill, capital and enterprise sufficient to conduct such researches. The lands on each side of a canal or river navigation, will rise in value in proportion as their produce is brought nearer to market, as they are more easily and cheaply ma-

nured, and as the industry, trade, population of the contiguous villages and country encrease, and as new towns are built.

If it be considered that England alone, within the last 40 years, has probably completed a much greater quantity of new cutting than we should be obliged to do, in order to accomplish the plan already detailed in these remarks, we ought not to fancy its extent at all to exceed our powers.—Were a fixed and steady scheme of operations scientifically formed and unremittedly persisted in till it be fairly completed, it is scarcely to be doubted that even in half the above period, the *grand trunk* already traced out, might be entirely opened, and the lesser and intermediate canals deriving from these would afterwards follow, as the occasions and circumstances of the country might require.

As in a small tract of this kind, it is impossible to enter more at length into the advantages that would result to the country at large from a scheme of this nature, it may not be improper to give some hints respecting the mode of carrying it into execution.

Let it be supposed that $200,000 per annum were strictly appropriated for such a number of years as would be necessary to complete the whole, or the greatest part of the navigations already specified.—Three questions will then arise from this proposition: 1. Where is the money to be found? 2. If found, in what manner is its expenditure to be guarded, so as to prevent its misapplication? And 3. Do there exist sufficient arguments of a commercial, political, and financial kind, to induce government to sanction such a plan, and thereby apply so considerable a portion of the public revenue to the attainment of this particular object?

The general answer to the first question is this: A nation possessed of so large a revenue, and in respect of many other countries very lightly taxed, may easi-

ly add one-twentieth more to the amount of its public burthens, for a limited time only, in order to obtain so essential a national benefit, which could not fail to repay the expence laid out in acquiring it, in a most abundant and even extraordinary degree. Tho' it would be wise certainly in the country to do this, yet the imposition of new taxes for such an object, would not perhaps be necessary—and even were the money to be borrowed, and not raised by taxes at all, the improvements consequent on its proper application, would soon repay both principal and interest.

As to the second enquiry, respecting the mode of preventing the waste of grants, though it may be allowed that no nation can work so cheap as an individual, where abuses must naturally take place, yet if government are only true to the trust that must be reposed in them by the public, on much greater occasions than this, it is certainly possible to invent such a system of checks and impediments to the baneful practice of jobbing, as to banish it almost entirely from the progress of this undertaking. The navigations proposed cannot be carried on immediately by government themselves, with any prospect of economy or success. The dictates of common sense, and the authority of *Dr. Adam Smith* concur together on this point. These navigations must be vested as *property* in the hands of individuals, or associated companies, to whom sufficient encouragement should be held out, to induce them to undertake each particular work. Though restricted to certain low tolls, little more than barely adequate to defray the charge of freight, and the expence of keeping the navigations in repair; still there cannot be wanting in this country undertakers of respectability and fortune, willing to adventure in this line of business, from the prospect of ultimately benefiting themselves or their posterity, by the future enlargement of agriculture and trade, consequent on

such improvement. By having a very accurately detailed *plan* and *estimate* of each particular work, formed by skillful engineers, partly to be employed by government, and partly by the undertakers, the former will exactly know what the work is to cost them, and the latter will be on their guard against embarking rashly in the scheme. This estimate should be the measure to government of their disbursements for the object proposed: Not a single shilling more ought, on any account, to be paid to the undertakers, than what is contained in the estimate; nor ought the entire money to be advanced at once, but gradually, and in proportion as the works are completed. —Thus, suppose a particular line of canal was estimated at $100,000; instead of paying the money all at once to the undertakers, government ought only to advance them a certain sum, say $20,000; and when they have satisfactorily accounted for the expenditure of one-half of this sum before certain commissioners of accounts, and when government are satisfied by the reports of their surveyors, appointed to inspect the works, that they are well and truly executed both in quantity and quality, according to the detailed plan and in proportion to the sum said to be expended; that then, and not before, a further sum of $10,000 be issued to them, and so on to the end of the operation.—Thus these undertakers could never have less than $10,000 nor more than $20,000 of the public money in their hands at any one time; and a more rigid species of watchfulness over the public purse cannot well be expected in this matter, during the progress of a plan of operations, which requires a certain degree of trust and confidence, and a certain amount of funds to carry it into effect. It would be the duty of government too to take care that the estimates be not too high, and of the undertakers to see, that they do not err in the other extreme: and if the undertakers should mismanage their funds, and expend more

on any part of the works than they ought really to have cost them, according to the estimate, still the stable property they possess in these works might dispose, and would probably induce many of them to go on nevertheless, by reforming their mode of proceeding, even though they receive no more than the exact amount of the estimate. The approving of these estimates then, and the task of examining whether the works advance according to the sums disbursed, are the only points left to the discretion of government, subject as all other public accounts are, to the thorough investigation of a house of representatives. Now, so far from having any better security than this, we cannot generally entertain so good a confidence, that the public money shall be as honestly and fairly expended on any other object; for the money originally bargained for, being advanced only in proportion as the works themselves are completed, or nearly so, there scarcely exists a possibility of any gross and fraudulent imposition on the public.

Respecting the third and last enquiry, whether the government ought to patronize a scheme of this kind, and lay it down as a *maxim of state*—that for many years to come, a considerable sum, suppose $200,000 a year, should be expended in making canals in this country, he must have read even this short essay to very little purpose, who can hesitate to answer this question in the affirmative. Should a person whose capital is abundantly sufficient to enclose, drain, and manure a farm in his possession, suffer it notwithstanding, to run to waste, and instead of expending two dollars an acre upon it, in order to receive four annually, should be contented with the mere *gleanings* which it is capable of throwing up in a state of uncultivated nature, we should not hesitate to pronounce him a very sorry farmer, and even in some degree a nuisance to society. Precisely of the same nature would the conduct of government be, were they long-

er to neglect so fine a country as this, and not embrace whatever means were in their power to render it as productive as possible, by one plan of navigation thro' every part of the union. Nay, the farmer would, to all appearance, have the most reasonable objection of the two, to the idea of throwing his money away as he might possibly call it; for, if his agricultural experiments did not succeed, his money would be all paid away to persons, who were perhaps utter strangers to him; whereas the sums expended by the country in the prosecution of great works of internal improvement, are all distributed among her own children, go all to feed her own labourers, and in a country situated as this, such a stimulus to industry and enterprize, such a regular and permanent distribution of the circulating medium to those who are willing to earn it and *to no others*, could not fail to be attended with the happiest and most beneficial effects. Not a single acre of grain would be sown the less, because a thousand labourers were constantly employed on canals in different parts of the country. Our population is adequate to the support of a much greater amount of extra-labor than these would perform, without any sensible diminution of our manufactures, or produce of any kind.

Now, it cannot be denied, because the matter has been already placed beyond all doubt, that a comprehensive plan of inland navigation, if carried into effect, would form a principal, if not the very chief ingredient to regularity and labor. The industry that it would excite, in the very execution of it, would serve to introduce habits of laborious and skilful exertion, which would afterwards be turned to other objects. These objects would be supplied by the very plan itself, would be multiplied, and diversified *ad infinitum* by the facility and regularity of the intercourse which it would create between all parts of the country, even the most remote. Were

this country divided by canals according to a regular system, no part of it, situated on their banks, would, in respect of the present rate of carriage, be farther removed from any other part than from 20 to 25 miles. For in comparison with the present dispersed, and disjointed state in which the inhabitants live, the greatest part of them would then be able to communicate with each other, to send commodities to, and receive them from each other, at the same identical expence as they could do, were they collected, at this moment, into a circle whose radius is from 20 to 25 miles. The simple reduction of the price of carriage would evidently effect this; and as far as trade, agriculture, and manufactures are concerned, would bring almost every part of the country so much nearer to every other part of it, than they at present are. The reader may be left to figure to himself the advantages that must inevitably arise from thus converting the entire country into *one great city*, without any of the disadvantages that attend the residence of mankind, in great numbers together, on the same spot. Were he duly to consider the consequences of such a radical change, he could not hesitate to pronounce, that it would of itself tend to advance this country a century in agriculture, trade, and opulence, sooner than similar advances could be made in the ordinary manner, and by the slow progress of society. The improvement of this country is progressive, and has been so, in an astonishing degree, but the progress is very tedious when compared with what it is capable of, by cutting canals, that another century at least must pass away before we acquire a degree of internal trade sufficient to induce individuals, as in Great Britain, to undertake the cutting of canals in every direction, as an advantageous private speculation. Being utterly unable then to copy that illustrious example, at the present moment, and their being no likelihood of our becoming so, within

any reasonable period of time, if government really wants to cultivate this country, as they ought, or it is capable of, if they wish to introduce among our people a true spirit of industry and useful labor, and that attachment to government which never fail to accompany that spirit—if they wish, in short, to effect these noble purposes at least half a century sooner than they could be obtained in any other manner,—they will come forward boldly, manfully, and at once, and laying aside on this occasion, the example of England as not at all applicable to the circumstances of this country, they will adopt, as their model, the practice of all other states, in which works of such general utility have been uniformly constructed at the public expence.—Even with regard to England, it may be affirmed without any danger of contradiction, that had she begun to construct canals a century sooner than she did, her progress in opulence would have been accelerated, and her prosperity would have risen, if not in a similar proportion, at least to a very considerable and even surprising heighth above her present attainments. *England has made canals, let canals make America.*

With regard to financial considerations, it is not perhaps necessary to enlarge much on arguments of this kind, because they are, as it were, evident corollaries arising from the whole of what has been attempted to be proved. To accelerate by half a century, suppose, or any other considerable period of time, the cultivation of our country, such as England, must be an unspeakable pleasure to us, under the evils of the funding system as practised in England, which has drawn so largely on posterity, and which is likely to involve her in ruin, compared with her means of redeeming it, as that which is now felt by Great Britain. In respect of taxation too, the more this country is improved, precisely in the same proportion would be the advantage; and surely posterity cannot complain as it would furnish her with the ability to pay any contribution proposed, or to encrease our funds

in future, as the whole would be expended for their benefit. Now if $200,000 a year wisely and consciens ly expended, in consequence of a preconcerted plan, formed with the utmost caution, diligence, and skill, and with the sole view of facilitating trade and industry in the most effectual manner, would be sufficient, in less than 20 years, to open the greatest part of the navigations already specified, of which there can be but very little doubt; it is almost a self-evident proposition, that, at no very distant period thereafter, the money would be refunded ten-fold to the government, by the encreased ability of the country to pay taxes of every description, an ability which would be as permanent and as durable as that very public prosperity, from whence it takes its rise.

As the government seem to look forward to posterity, in some of their most favorite measures, and to reckon on the suffrages of millions yet unborn, as the most ample rewards for their extraordinary exertions; perhaps they will transmit a regular and settled system for conferring on this country the benefits of water-carriage, as a *solemn legacy to posterity*. Of all great measures it may be truly said that this, if carried into effect, is likely to be accompanied with the greatest portion of unequivocal good, mixed with the least alloy of evil.

One consideration ought, however, in conclusion to be strongly impressed on the minds of those who may be willing to profit by these hints. No enterprize of this kind will ever be crowned with success, unless the entire plan of it be previously formed, with all its relations and bearings, unless the facts upon which that plan depends be narrowly examined and positively ascertained, unless in short a great deal of trouble and expence be incurred in forming the best dimentions for the locks, the size of the canal, and the enquiry for these purposes, conducted by all the lights that the science, and all the penetration that the exercised understandings of the first men in this country

and the best engineers in Europe can possibly contribute. It is from the want of minute and systematic knowledge of this kind, it is from the omission of laboring for years to form an exact acquaintance with the levels by a topographical survey of the country, the altitude and direction of its mountains, the course and depth of its rivers, the obstacles to be overcome, and the means by which they are to be got over, that many projects in themselves perfectly practicable, are looked upon as chimerical, that many more have been attempted which were either in themselves of little use, or were soon relinquished through unforeseen difficulties, and that the business of inland navigation has consisted of a series of lame and abortive attempts, has left an impression very unfavourable to the expediency of encouraging such pursuits in this country. Every thing in a matter of such consequence ought to proceed by system, and not be left to the caprice of ignorant and interested individuals; and when once a scientific scheme of operations is maturely framed, the possibility of deviating from it ought to be prevented, by its receiving the sanction of legislative authority.

I shall conclude these remarks with shewing to the stockholders, the legislature, and the public, not only the practicability of finishing the undertaking, but that by far the most difficult part has been accomplished, and that at an expence by no means great in proportion to the work accomplished, when I consider the novelty of the undertaking, and that it was commenced without the aid or advice of men of experience in undertakings of this kind.

By Mr. Weston's reports on the Delaware and Schuylkill canal, dated the 2d of April, 1793, he gives a particular plan of the whole work, with the section and nature of the ground, and a comparative estimate of the difficulty of every part of it, which is unnecessary to state here at large. The following are extracts from his report of Dec. 16th, 1794.

" This Canal is intended to answer the double ' purpose of forming a capital link in the great chain ' of western navigation, from the Ohio and lake Erie ' to Philadlephia, as well as an abundant supply of ' wholesome water to all parts of the city. The ' canal will connect the navigation of the Schuylkill ' with the Delaware, and is carried on a level of 49 ' feet above the high water mark of the Delaware, for ' about 16 miles to Broad-street; and from thence is ' conducted into the Delaware above Callow-hill- ' street, thro' six locks, the distance being about one ' mile. The report of the deputy engineer states, that ' *one third of the work is finished, and that contracts ' are formed and forming for a vigorous prosecution ' during the present year; and the committee with ' confidence can assert, that a proper attention of the ' stockholders to the punctual payment of the monies ' when called for by the president and managers, will ' enable the board to draw a toll for part of the distance ' in the year 1796, and to complete the whole in three ' or four years.

' The stock of the company, as already described, ' amounts to £150,000, which from the costs of that ' part of the canal already cut, will be sufficient for the ' completion of the work necessary for the transporta- ' tion of produce.

Respecting the dimensions of this canal, it has been determined:

1st. That the width of the bottom be twenty feet.

2d. That the depth of water be three feet and an half.

* By a rough calculation, which is by no means exaggerated, I find we have blasted with powder and quarried, five millions four hundred and forty-five thousand cubic feet of rock, and have mounded up, between the towing path of the canal and the river, a bank with the stone and rubbish, from 20 to 25 feet high from its base in the river. We have made at our brick-yard, last summer, about three hundred thousand bricks.

At the lower end of the canal, in the vicinity of the city, through the distance of two miles and three quarters, there have been two hundred and fifty thousand cubic yards of earth and gravel and partly rocks, removed out of the bed of the canal, and ten culverts built and completed.

3d. That the width of the canal be thirty feet and an half.

4th. That the width of the towing path be ten feet.

5th. That the towing path be not less than one foot above the surface of the water in any place.

6th. That the locks be constructed to admit boats of sixty feet in length and nine feet in width.

7th. That the descent of the canal be at the rate of two inches per mile.

And on February 1st, 1796, he makes the following report:

'With regard to the present situation of the work, 'it appears that when the contracts now entered into 'are completed, near six miles of the canal will be 'navigable—it may be proper to observe that the 'upper and lower districts, containing together the 'above mentioned quantity, have been by far the 'most difficult and expensive in the execution. The 'works as might have been expected, from not having been regularly attended to, are in some places 'out of repair, but it is so trifling that a small company of men in a few weeks would restore them to 'their original state. The delay in the progress of 'the work, though it has been detrimental in the instance above mentioned, yet otherwise has been 'beneficial in its consequence by allowing time for 'the gradual, and complete settling of the different 'embankments.

'With respect to the best mode of conducting the 'works in future, I am of opinion, that under the 'present existing circumstances, it will be adviseable 'to suspend all operations at the upper end when the 'contracts now existing are finished, and to make 'every exertion to complete the canal between the 'falls and the city. The distance between these two 'places is nearly five miles, of which three miles are 'either finished or contracted for; leaving a distance 'of two miles to be finished—This part I would ad-

'vise to be set in small and successive contracts until 'the whole is undertaken.

'On the supposition that means are not wanting 'to carry on the works with the greatest vigor, I am 'of opinion that the whole of this distance, inclu- 'ding the aqueduct at the falls may be completed in 'the year 1797, so as to be capable of receiving such 'supplies of water as can be conducted into it, and 'thereby affording the convenience of water-carriage 'for the transportation of building stone, marble, 'lime, or any other article, from the falls to Broad- 'street continued; this would be a very desirable 'circumstance, as it would not only be producing an 'interest to the stockholders, but would also be ex- 'tremely serviceable to the city by opening a commu- 'nication with several valuable quarries of stone, 'which from their situation are now totally useless.

'All the streams which are now conducted under the 'canal, may without much difficulty or expence be 'conveyed into it, and if the exhalation and leakage 'should render these insufficient in the summer sea- 'son, for the purpose of navigation, additional tem- 'porary supplies may be obtained by conducting the 'mill streams at the falls, and that which runs thro' 'the governor's garden over the aqueduct into the 'canal—all which is respectfully submitted to the con- 'sideration of the board.

'WILLIAM WESTON.

'*February* 1*st*, 1796.'

In this report of Mr. Weston's, it is stated that the most difficult parts of the work have been finished, and it appears by the books and proceedings of the company, that all the contracts were executed, except a few, which do not amount in the whole to more than $5000, and the expenditure of the company in December, 1794, when it was reported one third of the work was finished, did not exceed $159,159 2;

since which time there has been disbursed the sum of $62,559 4, making in all $221,710 6, by which it is evident that above five-elevenths of the work has been completed, and indeed if I were to take into consideration that the first expenditure was made without the assistance of Mr. Weston, and the other immediately under his eye, with an assistant and deputy engineer, I should conclude the latter sum was much more economically expended than the former, besides this, it may also be fairly presumed, even from the knowlege acquired by the members of the board during the progress of the work, and the circumstance that such undertakings are universally in their commencement, much more expensive than when they have been carried on for some time. It is, therefore, I think probable that nearly one half of the work is finished, taking the difficulties which have been surmounted into consideration.

By the following extract from a report of Mr. Weston, the Schuylkill and Susquehanna canal seems to promise equal success, if carried on with vigor.

'I flatter myself the progress made in the works, 'in the short space of seven months, will prove satis- 'factory to the board. On a careful comparison of 'the actual state of the various works, and an ample 'allowance for the completion of such parts as re- 'main unfinished, with the previous estimate laid be- 'fore the board in my last report, it appears, that 'from the east end of the summit level to Michael 'Kreitzer's plantation, a distance of more than four 'miles and a quarter, the actual expenditure will fall 'short of the estimated one at least *three thousand* '*pounds*. Though I would not wish to appear too 'sanguine, yet I may be allowed to draw favorable 'inferences of the remainder of the line; which, if 'realized cannot be more gratifying to the board than 'pleasing to myself. Independent of this, I have 'well founded reasons for asserting, that the works

'will rather proportionably diminish than increase in 'expence, as the important object of land carriage 'will, after the ensuing year, in a great measure be 'done away, by the canal being made subservient to 'that purpose. The sand for the locks, bridges, &c. 'will be (from the approaching proximity of the ca- 'nal) delivered at the respective works for little more 'than half the present cost; the same remark will 'hold good respecting the lime.'

The writer of these remarks having no other object in view than the success of an undertaking, which promises such great and lasting national advantages, has expressed himself with all that sincerity and freedom which the occasion demanded.—As he does not write for the multitude, or with a view to public applause, he has thought proper to prefer *matter* to *style*, and collect together as much argument as he could possibly crowd into so small a space; for propositions, tho' severally true, may sometimes throw much light on each other simply by their juxta-position, and by their being combined into one whole, stript of all tiresome and superfluous ornament.

FINIS.

ERRATA.

Page 6, last line, for *the* read *their*.
9, line 24, for *four or five* read *three or four*.
11, line 22, for *West* read *North East*.
11, line 24, for *West* read *North East*.
34, line 3, insert *and* before *in*.
34, line 10, dele *that*.
48, line 1, insert *and* before *population*.
55, line 2 and 3, read *conscientiously*.
55, line 36, read *dimensions*.
56, line 15, read *and* for *has*.
56, line 24, dele *with*, and insert *by adverting to the Delaware and Schuylkill canal, and*

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